

**EXHIBIT B**

## Domestic Patent Application Writing Sheet

The ETRI requests to write a patent application from you to write a specification within the due date.

September 18, 2003

ETRI

Intellectual Property Team Chief

Yoon Hyung Koo

Receipt	Head of YOUME Patent & Law Firm				
ETRI ref.	DP20030384	Paper publication (arrangement) date	20030910		
Title of invention	Handover method of mobile Internet system based on IEEE 802.16				
Main inventor	CHA, Jae-Sun	Lab.	AP tech research team, wireless system research group, Mobile communication research lab		
Co-inventor	CHANG, Sung-Cheol				
Related int'l patents	IP20030302(PCT) IP20030303(China)				
Contribution	Company fiduciaries		Ownership	Shared contribution	
Estimation results		Study topic account no.	03EM1130	Your esteemed firm's writer	Lee Won Il
ETRI estimator		Filing cost account no.			
ETRI contact	JANG, Soon-Keol, 860-5844				
ETRI requirements	<p>1. Keep in mind about the examination filing method. "A" is concurrent examination filing, and "B" is later examination filing.</p> <p>2. Progress filing taking heed to publication (arrangement) date. Please file before publication in the case of arranging publication, and call ETRI if inevitable.</p> <p>3. Other matters to be attended to: Please write the specification after checking novelty from inventor.</p>				
ETRI manager requirements	<p>1. Please finish writing the draft within a week from sending date, and send it to the inventor.</p> <p>2. If failing to keep the specification writer or writing due date designated by ETRI, please contact ETRI manager or your dispatched worker</p>				
Attachment: 1 copy of file relating to domestic patent application					

# Patent inventor statement

Team:(7203) AP tech research team, wireless system research group, Mobile communication research lab  
 Tel:860-5587 Person in charge: Cha Jae Sun

Document no.	013020040074	Internal	In charge	Team leader	Group Leader
Patent Select	Domestic/Int'l patent	approval			
Domestic ref no.					
Title of invention	Korean	Handover method of mobile Internet system based on IEEE 802.16			
	English	A Handover Scheme in IEEE 802.16 based Wireless Internet System			
Research project	Account no.	03EM1130		Contribution/ public institution	Company fiduciaries
	Total period of project	2003.01.01~2005.12.31			
	Research project title	2.3GHz-band High-speed Portable Internet (HPi) System research and development			
	Research title	AP tech research			
	Project manager	KIM, Kyung Soo (00964)			
	Ownership	ETRI			
	Filing countries		<Assign management no.>		<Cancel management no.>
Filing countries	Ref no.	Filing country	Ref no.	Filing country	Ref no.
Korea	DP20030384	US	IP20030302	China	IP20030303
Assignment	Do you assign the rights for invention? Yes				
To be published	The present invention is/is to be published in Standardization conference of 802.16 Session #27 (To be published in September10, 2003).				

Priority Art	Is the invention published place confidential? No		
	Attached priority art search report, list, and specification? Yes		
Receiver: Intellectual property team		Technique classification	Base station skill (171100)
Settlement	Temp		September 16, 2003 Main inventor: Cha Jae Sun

# Information on inventors

\*\* Input regular research worker for the first inventor (priority 1)

Priority	Worker	Korean name	Korean address	Own (%)
		Personal no.	English address	Telephone
		English name	Chinese address	e-mail
		Chinese name	Team/authority	Residence no.
1	Internal	CHA, Jae-Sun	Hanjin shinsedae Apt. 905, Yeongun-dong, Sangdang-gu, Cheongju-city, Chooncheongbuk-do	50
		03407	161 Gajeong-dong, Yuseong-gu, Daejeon, 305-350 Korea	860-5587
		CHA, Jae-Sun		jscha@etri.re.kr
		車在善	AP tech research team, wireless system research group, Mobile communication research lab	720430-1475732
2	Internal	CHANG, Sung-Cheol	Expo Apt. 106-408, Jeonmin-dong, Yuseong-gu, Daejeon-city	50
		02895	161 Gajeong-dong, Yuseong-gu, Daejeon, 305-350 Korea	860-5456
		CHANG Sung-Cheol		scchang@etri.re.kr
		張性喆	AP tech research team, wireless system research group, Mobile communication research lab	700923-1110517

## **[Summary Sheet]**

### **[Summary]**

A handover function must be provided in order to provide mobility of a terminal in the IEEE 802.16-based wireless Internet system. IEEE 802.16 working groups provide various methods to support the handover function.

The present invention is applicable to the handover function used by the IEEE 802.16-based wireless Internet system, and it relates to a method for performing handover when a mobile terminal has woke up from an abnormal handover or the sleep mode and communication with an existing serving base station (BS) has dropped.

Regarding the handover provided by IEEE 802.16, handover is requested from an existing serving base station, one target base station (BS) is selected from among a plurality of base stations recommended by the serving base station, network re-entry is then performed. In the drop condition, the mobile terminal selects a random base station as a target base station from among neighboring base stations and performs network re-entry. However, in this case, since the target base station cannot know that the current mobile terminal attempts to perform network re-entry because of drop, it performs not network re-entry but initial entry to thus fail to maintain a service based session. In the case of network re-entry because of the drop condition, the present invention includes an identifier of a previous serving base station in a (ranging request (RNG-REQ) message that is initially transmitted to the target base station by the mobile terminal to notify the target base station that the mobile terminal is performing network re-entry. When the target base station has known this fact, it maintains a session by performing handover through exchanging a message with the serving base station through a backbone network.

### **[Representative Drawing]**

FIG. 3

### **[Abstract]**

There is no exact description of the HO process when the MSS detects a drop when the normal HO process with the serving BS has been complete or when it awakes from sleep-mode. When the MSS has detected a drop, it shall attempt network re-entry with its preferred target BS. In the worst case, the MSS shall re-establish connections as shown in the initial network entry because the target BS does not know the fact that the MSS attempts network re-entry after drop situation. Therefore, we propose that the unique identifier of the former serving BS be included in RNG-REQ message as a TLV when the MSS attempts network re-entry after a drop situation. If the target BS recognizes that the MSS attempts network re-entry because of a drop, it can process HO through backbone network.

**[Specification]**

**[Title of Invention]**

Handover Method of IEEE 802.16-based Wireless Internet System

**[Brief Description on Drawings]**

Figure 1 shows an example of handover in the IEEE 802.16-based wireless Internet system.

Figure 2 shows an operation of a mobile terminal when a drop is generated in the IEEE 802.16 -based wireless Internet system.

Figure 3 shows an operation of a mobile terminal when a drop is generated according to the present invention.

**[Detailed Description on Invention]**

**[Object of Invention]**

A handover method for supporting no-drop handover in the drop condition in the IEEE 802.16-based wireless Internet system will be provided.

**[Technical Field and Prior Art]**

The present invention relates to a handover method provided by the

IEEE 802.16-based wireless Internet system.

In the existing handover method proposed by IEEE 802.16, when a mobile terminal requests handover from a serving base station and the serving base station recommends target base stations available for supporting handover, the mobile terminal selects one of the target base stations and moves then. However, the currently proposed method may cause a problem before normal handover performed is finished or when the mobile terminal moves during the sleep mode and wakes up from the sleep mode but cannot communicate with the serving base station (i.e., a drop case). Regarding the method proposed by IEEE 802.16, when the mobile terminal senses a drop condition, it selects one of the neighboring base stations as a target base station and moves to it to perform network re-entry. However, since the target base station has no information on the corresponding mobile terminal, it fails to perform the network re-entry process and performs initial entry again. In this case, since a radio channel must be set again, the session with the viewpoint of service cannot be maintained.

#### **[Technical Object]**

The present invention has been proposed to solve the drawback of the handover scheme proposed by the IEEE 802.16, request handover by the serving base station in a like manner of the currently proposed handover method, and request handover by the target base station in the case of drop.

Technical objects for the present invention will be: 1) A method for performing the handover function in the case of a drop condition as well as the general case will be found. 2) A method for minimizing a length of a radio message will be found so as to efficiently use a radio resource. 3) A method for supporting the function through minimum correction will be found so as to maintain consistency with the existing handover method.

#### **[Configuration and Operation of Invention]**

FIG. 1 shows an example of handover proposed by IEEE 802.16. In FIG. 1, a mobile terminal (MSS) transmits a HO-REQ (Handover Request) message



to a serving base station to request handover. The serving base station checks whether the neighboring base station can accept the corresponding mobile terminal's handover request, includes a list of at least one target base station available for handover in a HO-RSP (Handover Response) message, and transmits it to the mobile terminal. Upon having received the HO-RSP message, the mobile terminal selects one of the target base stations recommended by the serving base station, notifies the serving base station of it, and attempts to perform network re-entry toward the corresponding target base station.

FIG. 2 shows an operation of a mobile terminal in the case of drop. Before normal handover performance is finished or when having woke up from the sleep mode and communication with the serving base station has been disconnected, the mobile terminal selects a random base station from among neighboring base stations as a target base station, and performs network re-entry. However, since the selected target base station has no information on the corresponding mobile terminal, the mobile terminal cannot perform the network re-entry process. Therefore, the mobile terminal performs initial entry process when it initially enters the network and sets the radio channel again. Therefore, the session with the viewpoint of the service is not maintained and data buffered by the previous serving base station can be lost.

FIG. 3 shows an example of handover according to the present invention. When the mobile terminal senses drop, it selects a random base station from among the neighboring base stations as a target base station, and performs network re-entry. In this instance, the RNG-REQ message that is an initial message transmitted to the target base station includes an identifier BS ID of a 48 bit length of the previous serving base station. When the RNG-REQ message includes a BS ID, the target base station determines that the mobile terminal attempts to perform network re-entry. In this instance, the target base station uses the BS ID to request information on the corresponding mobile terminal from the previous serving base station, and uses the information to perform the network re-entry process. Therefore, in this case, the handover is

requested by the target base station from the serving base station differing from the general handover case in which handover is requested by the serving base station from the target base station.

**[Effects of Invention]**

The present invention can provide a seamless mobile service by maintaining the session with the viewpoint of service by controlling a mobile terminal to perform handover through network re-entry in the drop condition. Also, the present invention uses the initial message transmitted to the base station to provide information on the previous serving base station and exchange terminal information through a backbone network while performing a process requiring no terminal information. Because of it, handover's delay time occurring during the drop condition can be minimized. Further, since the proposed method performs the process proposed by IEEE 802.16 in an almost like manner, additional cost for application can be reduced.

**[Claims]**

**[Claim 1]**

In applying a method for processing handover that occurs in a drop condition in an IEEE 802.16-based wireless Internet system, a method for requesting handover from a target base station other than a serving base station.

**[Claim 2]**

A method for using a RNG-REQ message that is an initial message transmitted to a target base station in order for the mobile terminal of Claim 1 to request handover from the target base station.

**[Claim 3]**

A method for including a BS ID of a previous serving base station in a message as a handover request in using the method of Claim 2.

FIG. 1

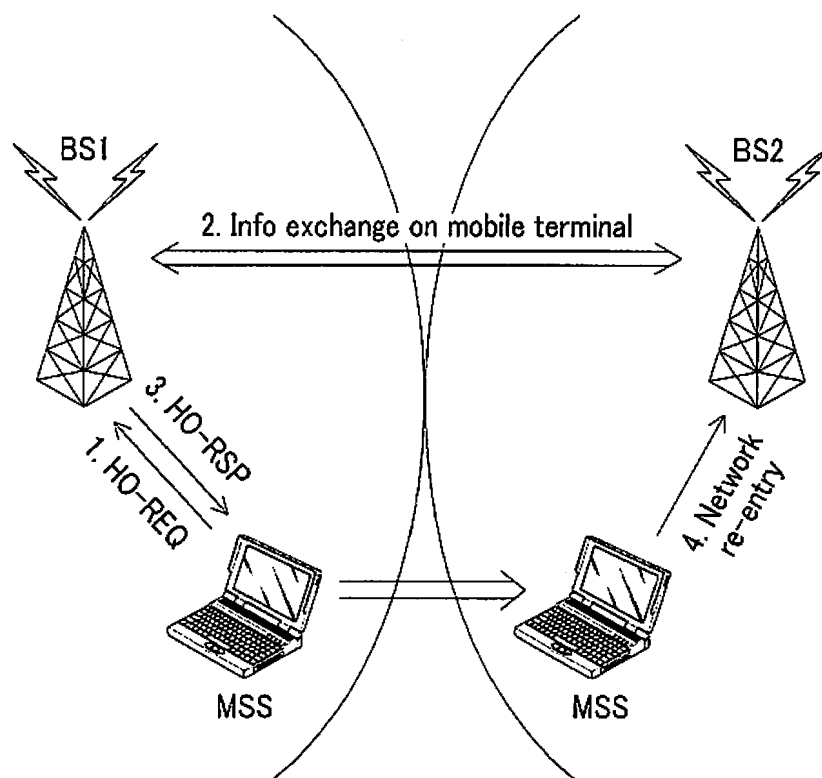


FIG. 2

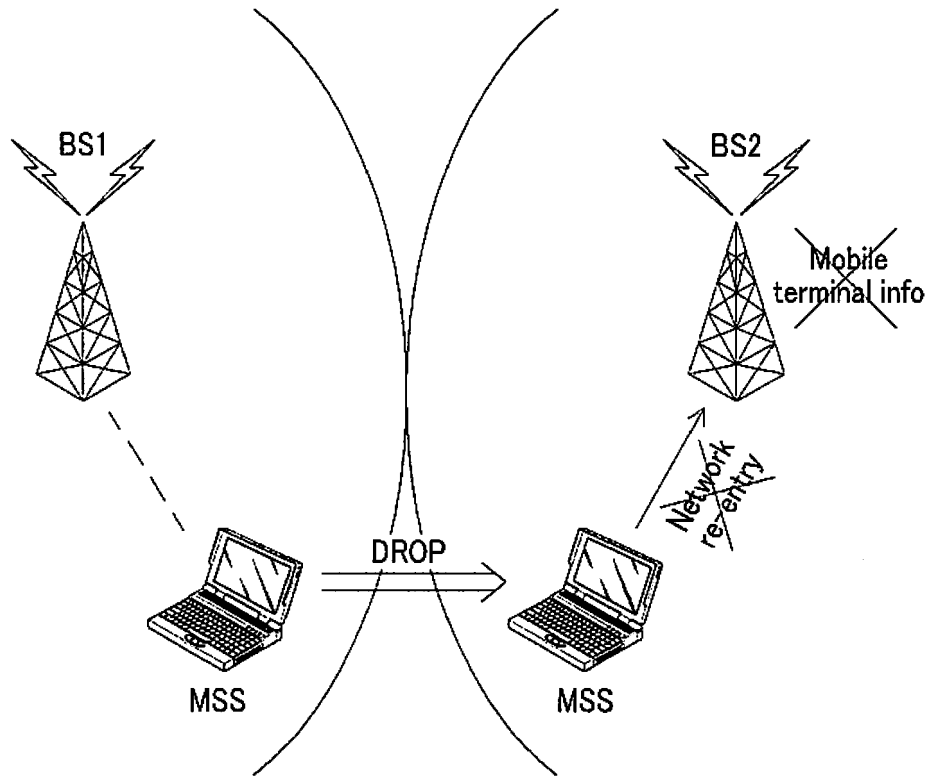


FIG. 3

